

EPA & Hydraulic Fracturing - Nov. 30

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11/30/2012	Frack secrets by thousands keep U.S. clueless on wells	FuelFix.com
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11/29/2012	MIT: Fugitive methane emissions from shale gas wells overstated	State Journal - Online, The
11/29/2012	'Fugitive' Methane from Shale Gas Lower than Believed	Laboratory Equipment - Online
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11/29/2012	More of the Same. Guess What Could Change That. (BGOV Briefs)	www.bloomberg.com

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FuelFix.com

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A subsidiary of Nabors Industries Ltd. (NBR) pumped a mixture of chemicals identified only as “EXP- F0173-11” into a half-dozen oil wells in rural Karnes County, Texas, in July.

Few people outside Nabors, the largest onshore drilling contractor by revenue, know exactly what’s in that blend. This much is clear: One ingredient, an unidentified solvent, can cause damage to the kidney and liver, according to safety information about the product that Michigan state regulators have on file.

A year-old Texas law that requires drillers to disclose chemicals they pump underground during hydraulic fracturing, or “fracking,” was powerless to compel transparency for EXP- F0173-11. The solvent and several other ingredients in the product are considered a trade secret by Superior Well Services, the Nabors subsidiary. That means they’re exempt from disclosure.

Drilling companies in Texas, the biggest oil-and-natural gas producing state, claimed similar exemptions about 19,000 times this year through August, according to their chemical- disclosure reports. Data from the documents were compiled by Pivot Upstream Group, a Houston-based firm that studies the energy industry, and analyzed by Bloomberg News. Nationwide, companies withheld one out of every five chemicals they used in fracking, a separate examination of a broader database shows.

Trade-secret exemptions block information on more than five ingredients for every well in Texas, undermining the statute’s purpose of informing people about chemicals that are hauled through their communities and injected thousands of feet beneath their homes and farms, said Lon Burnam, a Democratic state representative and a co-author of the law.

Truck-Sized Hole

“This disclosure bill has a hole big enough to drive a Mack truck through,” Burnam says of the law, which he called “much compromised legislation.”

“Is it meaningless because there are so many exemptions?” he asked. “I’m afraid it may be.”

The Texas disclosure bill marks a growing effort by the oil and gas industry to address public concerns about fracking, a drilling technique in which millions of gallons of water, sand and chemicals are pumped underground to free up more hydrocarbons. While the method has unlocked vast new sources of energy, safety questions center on the hundreds of chemicals used — many of them known carcinogens. The federal Environmental Protection Agency has little authority to regulate fracking; Congress decided in 2005 that the bureau wouldn’t oversee the practice.

Flaming Faucets

The 2010 documentary film “Gasland” showed homeowners near fracked wells igniting the water that flowed from their faucets. A year later, the EPA linked fracking to contaminated drinking water in Pavillion, Wyoming. The agency is retesting the Wyoming wells. A separate report from the U.S. Geological Survey this year confirmed the environmental agency’s initial finding; it detected levels of methane, ethane, diesel compounds and phenol, which the EPA had identified in 2011.

Companies including Houston-based Halliburton Co. (HAL) have embraced the Texas law as a model that “provides an

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enormous amount of information to the general public” while protecting trade secrets from competitors, said Susie McMichael, a company spokeswoman.

“Without such protection, companies would have no incentive to develop and put into use new technologies that are both environmentally beneficial and more effective,” McMichael said in an e-mail.

Largest Withholders

In August, the largest well-servicing companies that worked in Texas withheld the most information about frack jobs. Wells serviced by Halliburton and Houston-based Baker Hughes Inc., the second- and third-largest oilfield services companies respectively, contained more than nine secrets per well according to reports filed by the companies. Frack jobs by Superior Well Services, the Nabors subsidiary, omitted the most information with more than 32 secrets per well.

For neighbors of fracked wells, the omissions mean they can't use the disclosures to watch for frack fluids migrating into creeks, rivers and aquifers, because they don't know what to look for, says Adam Briggie, who is chairman of a citizen's group in Denton, Texas, called the Denton Stakeholder Drilling Advisory Group.

“We can't test to see what is coming into the environment,” says Briggie, 35, who also works as an assistant professor of philosophy at the University of North Texas in Denton. “If frack fluids are so harmless, why do they hold onto these trade secrets so strongly?”

Property Rights

Dennis Smith, a Nabors spokesman, didn't reply to several e-mails and phone messages requesting comment. Baker Hughes provides information on its fracking fluids “in a format that minimizes intellectual-property-rights risks to our products,” according to a statement e-mailed by company spokeswoman Pamela Easton.

Halliburton's McMichael noted that the Texas rules were written with input from environmental groups, including Environmental Defense Fund, a New York-based environmental group whose president, Fred Krupp, has called the supply of natural gas that may be liberated by fracking “a potential game changer.”

The Texas rules could “help industry do something that industry has trouble doing for itself — gain the public's trust,” wrote Scott Anderson, a senior policy adviser to EDF, in an October 2011 letter to the Texas Railroad Commission, which regulates oil and gas drilling in the state.

Watered Down

Yet the regulations “could wind up hurting public confidence rather than helping,” particularly if companies report fewer chemicals than the public expects, Anderson wrote. In an interview this week, Anderson said that while EDF considers the Texas rule “landmark legislation” that won industry support for disclosing chemicals, the group doesn't support the final version because it was watered down.

Industry lobbyists made it clear that they wanted strong trade-secret protections, “but they didn't say it would be this heavily utilized,” said Cyrus Reed, acting director of the Sierra Club's Lone Star chapter, who worked with companies to develop the rule. “It is disappointing to see this many trade secrets being claimed.”

The law, signed by Governor Rick Perry, a Republican, in June 2011, requires companies to disclose their fracking chemicals on FracFocus, a national website that the energy industry helped create in 2011 to allow for voluntary disclosure. Bloomberg News reported in August that more than 40 percent of wells fracked in eight major drilling states last year had been omitted from the voluntary site.

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Permitted Secrets

Oil and gas companies are permitted to withhold disclosure of chemicals and their concentrations in any product that they claim to be a trade secret under the Texas law. Such claims can be challenged by state regulators and landowners of well sites or adjacent parcels.

Several other states that require disclosure of fracking chemicals, including Louisiana, Montana, New Mexico and North Dakota, also leave it up to energy companies to determine what chemicals can be labeled secrets. North Dakota's rule requires companies to report fracking chemicals to FracFocus, beginning last April.

"We require whatever FracFocus requires," said Alison Ritter, a spokeswoman for the state Department of Mineral Resources' Oil and Gas Division.

The FracFocus website states that chemicals should be disclosed unless they're a trade secret, as defined by the U.S. Occupational Safety and Health Administration. The operators of FracFocus, which is supported by funds from the industry, don't check trade-secret claims or offer a way to challenge an exemption.

Every Ingredient

Mike Paque, the executive director of the Groundwater Protection Council, a group of state water officials that's one of the operators of FracFocus, didn't respond to requests for an interview.

"We have successfully fulfilled our commitment ... to ensure that Texans know every single ingredient used in the hydraulic fracturing process," said Elizabeth Ames Jones, then-chairwoman of the Texas Railroad Commission, when the law was signed last year. "Texans can be assured they will know more about what is going into the ground for fracturing than what goes into a can of soda," she said.

Jones said this month that she's proud of what Texas did. "There are people who want to use scare tactics to drive an agenda that is not good for America," she said in an e-mail.

Descriptions Withheld

The 19,000 trade-secret claims made in Texas this year through August hid information that included descriptions of ingredients as well as identification numbers and concentrations of the chemicals used. Overall, oil and gas companies withheld information on about one out of every seven ingredients they pumped into 3,639 wells.

In 5,000 other instances, Texas well operators failed to disclose information without saying why, filling in boxes on forms with "N/A" or "mixture," for example, or leaving them blank. Such omissions raised the total to almost seven secrets per well from about five.

Nationally, companies claimed trade secrets or otherwise failed to identify the chemicals they used about 22 percent of the time, according to a Bloomberg News analysis of FracFocus data for 18 states. The data were compiled and released this month by SkyTruth.org, a website that uses data and digital mapping to investigate environmental issues.

Among states with at least 250 fracked wells, Oklahoma had the most unknown components; almost a third were listed as trade secrets or had no valid identification numbers attached to them.

August Sample

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A smaller sample from Texas, the 370 wells that were reported in August 2012, showed that the number of secrets per well increased to almost eight when small frack jobs — those using less than 100,000 gallons of water — were excluded.

Although oil and gas companies submit the disclosures, the well-servicing companies they hire decide which chemicals will be disclosed or kept secret, said Halliburton's McMichael and others. The number of ingredients they withhold from disclosure can vary widely, based on the August data.

Wells serviced by Geneva-based Weatherford International Ltd. (WFT) averaged 0.1 secrets per well, while Baker Hughes (BHI) averaged 9.1; Halliburton, 9.3; and Superior Well Services, 32.5.

Melanie Kania, a spokeswoman for Weatherford, declined to comment.

Most of the secret chemicals are described only in general terms, such as "polymer" or "surfactant," leaving little clue about their contents, said Theo Colborn, president of The Endocrine Disruption Exchange. The Paonia, Colorado-based nonprofit, which is staffed by scientists, studies chemicals that interfere with human development and has criticized regulatory approaches to fracking.

Wyoming Approvals

Texas wasn't the first state to require disclosure of frack ingredients. In September 2010, Wyoming enacted a similar law, which requires an extra step to claim a trade secret. Companies need to apply with state regulators to explain why they need trade-secret protection for specific ingredients.

Since that rule went into effect, the Wyoming Oil and Gas Conservation Commission has approved 78 additives as trade secrets and rejected six such requests, according to Lori McCoy, a support specialist for the state agency.

Recently, more states are following the Texas model — with an assist from industry. In December 2011, the American Legislative Exchange Council (ALEC), a Washington-based public policy organization that brings together corporations and legislators to craft bills for states, adopted model legislation that is almost identical to the Texas rule.

Exxon Sponsorship

The model bill was sponsored inside ALEC by Exxon Mobil Corp. (XOM), which also advises the council from a seat on its "private enterprise board," according to ALEC documents obtained by Common Cause, a nonprofit group in Washington.

So far, legislators in eight states have proposed bills based at least in part on the ALEC model, according to Todd Wynn, the director of the organization's task force on energy, environment and agriculture.

The main author of the Texas bill said other states will tailor the language to their needs.

"Can it be better and should it be better?" asked state Representative Jim Keffer, a Republican. "Yes, and I think it will be better. People are going to use this bill as a base and then make it fit their state's attitude or their industry."

His Democratic co-author disagreed. It would be "a horrible mistake" for other states to use the Texas bill as a blueprint, Burnam said.

"Texas state government has been a wholly owned subsidiary of national oil and gas interests for a century," he says. "Do not look at it for guidance on anything related to protecting public health and safety."

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Much of the new technology has been driven to address fears about drilling, including hydraulic fracturing, the extraction technique that has turned impermeable shale into a bonanza of oil and gas.

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Activists and regulators are paying more attention to air emissions from shale-gas development, including toxins emitted during drilling and production. Much of the focus has been on releases of methane, the main component of natural gas as well as a potent greenhouse gas, though there is substantial disagreement over studies attempting to measure the methane leaks.

In devising the new rules, the EPA said it was acting under its Clean Air Act mandate to reduce emissions of volatile organic compounds and pollutants such as benzene, which can cause cancer. The agency said the new rules were expected to eliminate 95 percent of the smog-forming volatile organic compounds emitted from more than 13,000 new gas wells each year.

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The EPA said a "co-benefit" of green completions was a reduction in methane emissions by 1 million to 1.7 million tons a year.

The government delayed full implementation of the rule until 2015 to allow the industry to build enough equipment to handle the workload.

The American Petroleum Institute and other industry groups are challenging the new rules in the U.S. Court of Appeals in Washington. So are environmental groups.

"We'd say the rules have not gone far enough," said Jay Duffy, a staff attorney with Philadelphia's Clean Air Council, which joined with Earthjustice in October to notify the EPA it planned to sue.

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Natural gas producers turn to 'green completion' Centre Daily Times - Online

11/30/2012

SYCAMORE, Pa — SYCAMORE, Pa. - The towering flares that turn night into day in the Marcellus Shale gaslands are becoming an increasingly rare sight.

Natural gas producers are turning to new techniques to capture the gas emitted during the well-completion process. In the past, a well's initial production was typically vented or burned off to allow impurities to clear before the well was tied into a pipeline.

Now, more operators are employing reduced-emission completions - a "green completion" - a process in which impurities such as sand, drilling debris, and fluids from hydraulic fracturing are filtered out and the gas is sold, not wasted.

The five gas wells that EQT Corp. completed in October at this remote site in Washington Township, Pa., are typical. Compared to a gas flare, which roars like a jet engine and licks the sky with flame like a giant welder's torch, green completion is dull and quiet.

EQT is not the only drilling company that has embraced green completions. The equipment for separating the gas from the "flowback" has been perfected in the past decade, and in the next three years, using it will become standard practice across the nation.

The U.S. Environmental Protection Agency approved new rules this year requiring green completions nationwide by 2015, except for exploratory wells unconnected to pipelines. As of Oct. 15, drillers can no longer vent the gas into the atmosphere without burning.

The EPA says green completions will save drillers up to \$19 million a year by capturing natural gas that would be wasted.

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"We'd say the rules have not gone far enough," said Jay Duffy, a staff attorney with Philadelphia's Clean Air Council, which joined with Earthjustice in October to notify the EPA it planned to sue.

Duffy praised the EPA for taking action to curb toxic emissions from drilling, but he contends the federal agency failed to directly confront the climate-change issue. The EPA concluded in 2009 that greenhouse gases endangered public health and welfare, but it has not devised standards on methane emissions.

Anti-drilling activists argue that so much methane escapes from gas development it undermines the industry's claims about the clean-air benefits of the shale-gas boom.

The industry says environmentalists and the EPA are using inflated, biased estimates of methane emissions. It has denounced as hoaxes some of the infrared videos posted online that purport to show methane plumes.

Some industry leaders say the biggest benefit to green-completion technology is that they hope it puts the emissions controversy to rest.

"I do think it addresses a criticism that the industry has had in terms of methane emissions, and maybe we can take that off the table," Jack P. Williams Jr., president of XTO Energy, said in a recent interview.

EQT differs from many gas-exploration companies because it also serves a retail customer base through its gas utility in southwestern Pennsylvania, Equitable Gas Co. It says green completions achieve a significant emission reduction.

"EQT has an interest in minimizing our impact, our air impact in this case, in the basin where we have a social license to operate," said Place, a deputy secretary of the Pennsylvania Department of Environmental Protection before he went to work for EQT.

"We've been here for 120 years," he said. "We live in this community."

At EQT's drilling site on Pettit Run Road in rolling farmland about seven miles northwest of Waynesburg, Pa., workers explained the kind of assembly-line drilling operation they have devised that now incorporates green completions.

Before EQT began drilling on this five-acre site carved out of a hillside, the company first extended its pipeline network to the location so it would be ready to receive any gas produced, said Michael Rehl, manager of completion operations.

During the spring, the five wells were drilled in a row, 15 feet apart, to a depth of about 7,500 feet, where they turn horizontally into the Marcellus Shale layer and follow parallel paths, separated by about 1,000 feet. Then the wells were lined with several layers of steel pipe and concrete, and hydraulically fractured.

The completion process commenced in October when a contractor, Pure Energy Services Ltd., began cleaning out wells one at a time.

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At the outset, a well disgorges mostly sand, water, and chemicals used during the fracking process, along with drilling debris and minerals such as barium and manganese picked up from the shale formation. After about four days, the well produces mostly natural gas.

During a green completion, the mixture is routed through a series of filters. A cylindrical sand trap collects the solid materials, which are sent to a landfill. The water, containing the chemicals and mineral contaminants, is treated and stored for reuse in the next drilling operation.

And the natural gas is channeled into a pipeline and sent off to market, rather than being flared into the sky to achieve no other purpose than to heat the planet.

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Frack Secrets by Thousands Keep U.S. Clueless on Wells Bloomberg News - Online

11/30/2012

A subsidiary of Nabors Industries Ltd. (NBR) pumped a mixture of chemicals identified only as "EXP- F0173-11" into a half-dozen oil wells in rural Karnes County, Texas, in July.

Few people outside Nabors, the largest onshore drilling contractor by revenue, know exactly what's in that blend. This much is clear: One ingredient, an unidentified solvent, can cause damage to the kidney and liver, according to safety information about the product that Michigan state regulators have on file.

A year-old Texas law that requires drillers to disclose chemicals they pump underground during hydraulic fracturing, or "fracking," was powerless to compel transparency for EXP- F0173-11. The solvent and several other ingredients in the product are considered a trade secret by Superior Well Services, the Nabors subsidiary. That means they're exempt from disclosure.

Drilling companies in Texas, the biggest oil-and-natural gas producing state, claimed similar exemptions about 19,000 times this year through August, according to their chemical- disclosure reports. Data from the documents were compiled by Pivot Upstream Group, a Houston-based firm that studies the energy industry, and analyzed by Bloomberg News. Nationwide, companies withheld one out of every five chemicals they used in fracking, a separate examination of a broader database shows.

Trade-secret exemptions block information on more than five ingredients for every well in Texas, undermining the statute's purpose of informing people about chemicals that are hauled through their communities and injected thousands of feet beneath their homes and farms, said Lon Burnam, a Democratic state representative and a co-author of the law.

"This disclosure bill has a hole big enough to drive a Mack truck through," Burnam says of the law, which he called "much compromised legislation."

"Is it meaningless because there are so many exemptions?" he asked. "I'm afraid it may be."

The Texas disclosure bill marks a growing effort by the oil and gas industry to address public concerns about fracking, a drilling technique in which millions of gallons of water, sand and chemicals are pumped underground to free up more hydrocarbons. While the method has unlocked vast new sources of energy, safety questions center on the hundreds of chemicals used -- many of them known carcinogens. The federal Environmental Protection Agency has little authority to regulate fracking; Congress decided in 2005 that the bureau wouldn't oversee the practice.

The 2010 documentary film "Gasland" showed homeowners near fracked wells igniting the water that flowed from their faucets. A year later, the EPA linked fracking to contaminated drinking water in Pavillion, Wyoming. The agency is retesting the Wyoming wells. A separate report from the U.S. Geological Survey this year confirmed the environmental agency's initial finding; it detected levels of methane, ethane, diesel compounds and phenol, which the EPA had identified in 2011.

Companies including Houston-based Halliburton Co. (HAL) have embraced the Texas law as a model that "provides an enormous amount of information to the general public" while protecting trade secrets from competitors, said Susie McMichael, a company spokeswoman.

"Without such protection, companies would have no incentive to develop and put into use new technologies that are both

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environmentally beneficial and more effective,” McMichael said in an e-mail.

In August, the largest well-servicing companies that worked in Texas withheld the most information about frack jobs. Wells serviced by Halliburton and Houston-based Baker Hughes Inc., the second- and third-largest oilfield services companies respectively, contained more than nine secrets per well according to reports filed by the companies. Frack jobs by Superior Well Services, the Nabors subsidiary, omitted the most information with more than 32 secrets per well.

For neighbors of fracked wells, the omissions mean they can't use the disclosures to watch for frack fluids migrating into creeks, rivers and aquifers, because they don't know what to look for, says Adam Briggie, who is chairman of a citizen's group in Denton, Texas, called the Denton Stakeholder Drilling Advisory Group.

“We can't test to see what is coming into the environment,” says Briggie, 35, who also works as an assistant professor of philosophy at the University of North Texas in Denton. “If frack fluids are so harmless, why do they hold onto these trade secrets so strongly?”

Dennis Smith, a Nabors spokesman, didn't reply to several e-mails and phone messages requesting comment. Baker Hughes provides information on its fracking fluids “in a format that minimizes intellectual-property-rights risks to our products,” according to a statement e-mailed by company spokeswoman Pamela Easton.

Halliburton's McMichael noted that the Texas rules were written with input from environmental groups, including Environmental Defense Fund, a New York-based environmental group whose president, Fred Krupp, has called the supply of natural gas that may be liberated by fracking “a potential game changer.”

The Texas rules could “help industry do something that industry has trouble doing for itself -- gain the public's trust,” wrote Scott Anderson, a senior policy adviser to EDF, in an October 2011 letter to the Texas Railroad Commission, which regulates oil and gas drilling in the state.

Yet the regulations “could wind up hurting public confidence rather than helping,” particularly if companies report fewer chemicals than the public expects, Anderson wrote. In an interview this week, Anderson said that while EDF considers the Texas rule “landmark legislation” that won industry support for disclosing chemicals, the group doesn't support the final version because it was watered down.

Industry lobbyists made it clear that they wanted strong trade-secret protections, “but they didn't say it would be this heavily utilized,” said Cyrus Reed, acting director of the Sierra Club's Lone Star chapter, who worked with companies to develop the rule. “It is disappointing to see this many trade secrets being claimed.”

The law, signed by Governor Rick Perry, a Republican, in June 2011, requires companies to disclose their fracking chemicals on FracFocus, a national website that the energy industry helped create in 2011 to allow for voluntary disclosure. Bloomberg News reported in August that more than 40 percent of wells fracked in eight major drilling states last year had been omitted from the voluntary site.

Oil and gas companies are permitted to withhold disclosure of chemicals and their concentrations in any product that they claim to be a trade secret under the Texas law. Such claims can be challenged by state regulators and landowners of well sites or adjacent parcels.

Several other states that require disclosure of fracking chemicals, including Louisiana, Montana, New Mexico and North Dakota, also leave it up to energy companies to determine what chemicals can be labeled secrets. North Dakota's rule requires companies to report fracking chemicals to FracFocus, beginning last April.

“We require whatever FracFocus requires,” said Alison Ritter, a spokeswoman for the state Department of Mineral

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Resources' Oil and Gas Division.

The FracFocus website states that chemicals should be disclosed unless they're a trade secret, as defined by the U.S. Occupational Safety and Health Administration. The operators of FracFocus, which is supported by funds from the industry, don't check trade-secret claims or offer a way to challenge an exemption.

Mike Paque, the executive director of the Groundwater Protection Council, a group of state water officials that's one of the operators of FracFocus, didn't respond to requests for an interview.

"We have successfully fulfilled our commitment ... to ensure that Texans know every single ingredient used in the hydraulic fracturing process," said Elizabeth Ames Jones, then-chairwoman of the Texas Railroad Commission, when the law was signed last year. "Texans can be assured they will know more about what is going into the ground for fracturing than what goes into a can of soda," she said.

Jones said this month that she's proud of what Texas did. "There are people who want to use scare tactics to drive an agenda that is not good for America," she said in an e-mail.

The 19,000 trade-secret claims made in Texas this year through August hid information that included descriptions of ingredients as well as identification numbers and concentrations of the chemicals used. Overall, oil and gas companies withheld information on about one out of every seven ingredients they pumped into 3,639 wells.

In 5,000 other instances, Texas well operators failed to disclose information without saying why, filling in boxes on forms with "N/A" or "mixture," for example, or leaving them blank. Such omissions raised the total to almost seven secrets per well from about five.

Nationally, companies claimed trade secrets or otherwise failed to identify the chemicals they used about 22 percent of the time, according to a Bloomberg News analysis of FracFocus data for 18 states. The data were compiled and released this month by SkyTruth.org, a website that uses data and digital mapping to investigate environmental issues.

Among states with at least 250 fracked wells, Oklahoma had the most unknown components; almost a third were listed as trade secrets or had no valid identification numbers attached to them.

A smaller sample from Texas, the 370 wells that were reported in August 2012, showed that the number of secrets per well increased to almost eight when small frack jobs -- those using less than 100,000 gallons of water -- were excluded.

Although oil and gas companies submit the disclosures, the well-servicing companies they hire decide which chemicals will be disclosed or kept secret, said Halliburton's McMichael and others. The number of ingredients they withhold from disclosure can vary widely, based on the August data.

Wells serviced by Geneva-based Weatherford International Ltd. (WFT) averaged 0.1 secrets per well, while Baker Hughes (BHI) averaged 9.1; Halliburton, 9.3; and Superior Well Services, 32.5.

Melanie Kania, a spokeswoman for Weatherford, declined to comment.

Most of the secret chemicals are described only in general terms, such as "polymer" or "surfactant," leaving little clue about their contents, said Theo Colborn, president of The Endocrine Disruption Exchange. The Paonia, Colorado-based nonprofit, which is staffed by scientists, studies chemicals that interfere with human development and has criticized regulatory approaches to fracking.

Texas wasn't the first state to require disclosure of frack ingredients. In September 2010, Wyoming enacted a similar law,

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which requires an extra step to claim a trade secret. Companies need to apply with state regulators to explain why they need trade-secret protection for specific ingredients.

Since that rule went into effect, the Wyoming Oil and Gas Conservation Commission has approved 78 additives as trade secrets and rejected six such requests, according to Lori McCoy, a support specialist for the state agency.

Recently, more states are following the Texas model -- with an assist from industry. In December 2011, the American Legislative Exchange Council (ALEC), a Washington-based public policy organization that brings together corporations and legislators to craft bills for states, adopted model legislation that is almost identical to the Texas rule.

The model bill was sponsored inside ALEC by Exxon Mobil Corp. (XOM), which also advises the council from a seat on its "private enterprise board," according to ALEC documents obtained by Common Cause, a nonprofit group in Washington.

So far, legislators in eight states have proposed bills based at least in part on the ALEC model, according to Todd Wynn, the director of the organization's task force on energy, environment and agriculture.

The main author of the Texas bill said other states will tailor the language to their needs.

"Can it be better and should it be better?" asked state Representative Jim Keffer, a Republican. "Yes, and I think it will be better. People are going to use this bill as a base and then make it fit their state's attitude or their industry."

His Democratic co-author disagreed. It would be "a horrible mistake" for other states to use the Texas bill as a blueprint, Burnam said.

"Texas state government has been a wholly owned subsidiary of national oil and gas interests for a century," he says. "Do not look at it for guidance on anything related to protecting public health and safety."

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Daniel Acker/Bloomberg

Drill pipe sits on a rack near a Nabors Industries Ltd. crude oil drill rig contracted by Fidelity Exploration & Production Company, a subsidiary of MDU Resources Group Inc., outside New Town, North Dakota.

Drill pipe sits on a rack near a Nabors Industries Ltd. crude oil drill rig contracted by Fidelity Exploration & Production Company, a subsidiary of MDU Resources Group Inc., outside New Town, North Dakota. Photographer: Daniel Acker/Bloomberg

Mark Drajem/Bloomberg

John Fenton, a local farmer, stands next to an Encana Corp. gas well near his home in Pavillion, Wyoming, U.S., on July 5, 2012. The U.S. Environmental Protection Agency said in a draft report last December that this area is the nation's one established incident of water contamination from hydraulic fracturing.

John Fenton, a local farmer, stands next to an Encana Corp. gas well near his home in Pavillion, Wyoming, U.S., on July

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5, 2012. The U.S. Environmental Protection Agency said in a draft report last December that this area is the nation's one established incident of water contamination from hydraulic fracturing. Photographer: Mark Dragem/Bloomberg

Harry Cabluck/AP Photo

Rep. Lon Burnam, D-Ft. Worth, speaks during a news conference in Austin, Texas.

Rep. Lon Burnam, D-Ft. Worth, speaks during a news conference in Austin, Texas. Photographer: Harry Cabluck/AP Photo

Rates may include points.

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Methane
National Geographic - Online

11/30/2012

Burn natural gas and it warms your house. But let it leak, from fracked wells or the melting Arctic, and it warms the whole planet.

The last rays of sun filter through the snow-covered spruces along the shore of Goldstream Lake, just outside Fairbanks, Alaska. Out on the lake Katey Walter Anthony stares at the black ice beneath her feet and at the white bubbles trapped inside it. Large and small, in layer upon layer, they spread out in every direction, like stars in the night sky. Walter Anthony, an ecologist at the University of Alaska Fairbanks, grabs a heavy ice pick and wraps the rope handle around her wrist. A graduate student holds a lighted match above a large bubble; Walter Anthony plunges the pick into it.

Gas rushing from the hole ignites with a whoomp that staggers her. "My job's the worst, because usually you catch on fire," she says, smiling. In the gathering twilight she and her team ignite one bubble after another.

The flames confirm that the bubbles are methane, the main component of natural gas. By counting and measuring them, Walter Anthony is trying to gauge how much methane is rising from Goldstream Lake—and from the millions of similar lakes that now occupy nearly a third of the Arctic region. The Arctic has warmed much faster than the rest of the planet in recent decades, and as the permafrost has melted, old lakes have grown and new ones have formed. Methane bubbles from their muddy depths in a way that is hard to quantify—until the first clear ice of fall captures a snapshot of the emissions from an entire lake.

Sometimes as Walter Anthony walks that ice, in Alaska, Greenland, or Siberia, a stamp of her boot is enough to release an audible sigh. Some lakes, she says, have "hot spots" where the methane bubbling is so strong that ice never forms, leaving open holes big enough to spot from an airplane. "It could be 10 or 30 liters of methane per day from one little hole, and it does that all year," she says. "And then you realize there are hundreds of spots like that and millions of lakes." By venting methane into the atmosphere, the lakes are amplifying the global warming that created them: Methane is a potent greenhouse gas. Carbon dioxide is the main one, because the atmosphere holds 200 times as much of it. But a given amount of methane traps at least 25 times as much heat—unless you burn it first. Then it enters the atmosphere as CO₂.

That's the other side of this Jekyll-and-Hyde story: A lot of methane is being burned these days. In the past decade the technology called hydraulic fracturing, "fracking" for short, has enabled drillers in the United States to extract natural gas from deeply buried shales they couldn't tap before. Natural gas supplies have surged; prices have plummeted. Fracking is now spreading around the world, and it's controversial. The gas boom has degraded landscapes and polluted water. But it has also had environmental benefits. Natural gas burns much cleaner than coal. In part because American power plants have been switching from coal to cheap gas, U.S. emissions of CO₂ from fossil fuels fell last year, even as the world set another record.

The catch is, methane emissions are rising. What's coming out of Arctic lakes is troubling, Walter Anthony says, because some of it seems to be coming not from bottom mud but from deeper geologic reservoirs that had hitherto been securely capped by permafrost—and that contain hundreds of times more methane than is in the atmosphere now. Still, most methane emissions today come from lower latitudes, and most are related more directly to human activities. A growing amount seems to be leaking, for instance, from gas wells and pipelines. Just how warm Earth gets this century will hinge in part on how we balance the good and bad of methane—on how much of it we capture and burn, and how much we inadvertently let loose.

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Methane is the simplest hydrocarbon—a single carbon atom surrounded by four hydrogen atoms. It usually forms when larger organic molecules are broken down, either by microbes or by heat. The microbes produce it when they eat dead plant matter in wet, oxygen-poor environments. They're the source of the methane bubbling up from Goldstream Lake; from swamps and marshes all over; from human-made rice fields, landfills, and manure lagoons; and from the stomachs of cows and other ruminants. Termites emit a lot of methane too.

Most of the natural gas we tap for fuel, however, was formed not by microbes but by heat and pressure deep underground—as oil and coal were, and often in the same places. In coal mines methane is an explosion hazard; in oil fields it was long considered a nuisance to be burned off or, worse, vented directly into the atmosphere. Liquid oil was more valuable as fuel and much easier to transport to markets. Then pipelines built during the post-World War II construction boom made gas more transportable. The energy industry began to exploit massive natural gas reservoirs in places like Russia, Qatar, and Iran.

The United States produces the bulk of its own gas, but U.S. production peaked in 1973. By 2005 the country seemed to be running short, and the industry was building expensive new tanker terminals to import liquefied natural gas. The fracking boom changed that. Since 2005 gas production from deep shales has increased more than tenfold; it now accounts for more than a third of total production, which last year surpassed the 1973 record. Within a decade, according to a Department of Energy (DOE) forecast, the U.S. will become a net exporter of gas.

Estimates of how much gas is locked up in shales and how long the boom can last have varied widely. In 2011 DOE put the amount of “unproved resources” of shale gas at 827 trillion cubic feet; in 2012 it cut that estimate by more than 40 percent. Production from fracked wells has declined faster than DOE analysts had expected. So some critics believe the boom is a bubble that will soon burst. But DOE still projects that U.S. gas production will rise rapidly and that shale gas will make up half the total by 2035.

And deep shales are not the last methane source. DOE and the industry are trying to figure out how to tap the largest one of all—the methane hydrates that lie frozen under vast areas of seafloor and Arctic permafrost. Worldwide, hydrates may contain more energy than all other fossil fuels combined. They're usually snow-white and look like ice, but they're strange stuff, and extracting the methane is tricky. Each molecule is trapped in a cage of water molecules that's stable only at high pressure and low temperatures; change either just a bit, and the cage crumbles. The escaping methane balloons in volume by a factor of 164.

Oil companies working on continental margins have to take care that extracting oil through an overlying hydrate layer does not disrupt it and perhaps damage the well. Climate scientists worry that global warming could destabilize hydrate layers, on land or at sea, triggering a massive methane release that would amplify the warming. A few scientists take seriously a catastrophic scenario in which the release happens rapidly, within a human lifetime, and the planet's temperature spikes.

The atmospheric methane concentration has risen nearly 160 percent since preindustrial times, to 1.8 parts per million. For a few years, from 1999 to about 2006, it seemed to level off. Some researchers credit Asian rice farmers, who began draining their paddies during the growing season to conserve water—which reduced methane emissions as well. Another theory credits the oil industry, which started capturing and selling methane it used to simply vent. Since 2006, though, atmospheric methane has been rising again. Many observers believe it's no coincidence that the number of wells punched into deep shales has been soaring too.

The largest U.S. shale formation, the Marcellus, lies about a mile under the Appalachian Mountains, in an arc that runs from West Virginia to New York through Ohio and Pennsylvania. The Pennsylvania stretch is pretty country: rolling hills and pastures and, in the northwest, the forests of the Pennsylvania Wilds, which boast some 2,000 trout streams and one of the darkest night skies in the East.

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These days tank trucks, sand haulers, flatbeds stacked with pipe, and cement mixers rumble continually over the winding two-lane roads. Here and there in patches cut from forest or farm are flattened, four-acre mounds of fresh dirt. For a few weeks at a time tall derricks rise from these drill pads, and the trucks and trailers congregate around them. Contaminated water from the new wells pours into tank trucks or into lagoons lined with dark plastic. The derricks soon disappear, but the wells stay, connected by clusters of green pipes and valves to permanent new pipelines, condensate tanks, and compressor stations. Much of Pennsylvania has been transformed since 2008.

The boom's roots go back to the 1980s and to Texas, where a wildcatter named George Mitchell, facing dwindling reserves, began probing the Barnett Shale near Dallas. Black shales, the compressed mud of ancient seas, were known as petroleum source rocks. But over geologic time much of the oil and gas had migrated out of the shales into porous sandstone traps—and that's where the industry sank its wells. Wells ending in shale never yielded much; the shales were too dense and impermeable to allow gas to flow.

Mitchell Energy's workaround, developed over 20 years with support from DOE, became the recipe for the fracking boom. It has two parts. First, drill down to the shale, then continue drilling horizontally for a mile or so inside it; that puts more gas close to the well. Second, inject millions of gallons of water, chemical lubricants, and sand at high pressure to shatter the shale, allowing methane to rush into the well.

The gas from fracked wells has benefited consumers; 55 percent of the homes in the U.S. have gas heat, and prices last winter reached a ten-year low. In Pennsylvania the boom has revived businesses; created some 18,000 jobs, by the state's reckoning; and paid millions of dollars in lease-signing bonuses and royalties. However, some landowners who leased their land to gas companies have since had second thoughts.

Sherry Vargson is one. In 2008 Chesapeake Energy began drilling on her family's 197-acre dairy farm in Granville Summit, in northeastern Pennsylvania. In June 2010, after a crew had been working on the well, Vargson turned on her kitchen tap to find it backed up with what she thought was air. "It was like drawing a glass of Alka-Seltzer, very sizzly and bubbly," she recalls. Testing showed the water contained more than twice the methane that's considered an explosion threat. Chesapeake has been supplying her with bottled water ever since, while arguing that the contamination is natural. Meanwhile Vargson's monthly royalty checks have shrunk from more than \$1,000 to less than \$100, as production from the gas well has plummeted.

The industry's main argument in attempting to reassure a worried public in Pennsylvania and elsewhere has been that shales typically lie thousands of feet below drinking-water aquifers. So contamination, whether by shale gas or fracking wastewater—which contains fracking chemicals, salt, heavy metals, and radioactive elements leached from the rock—should be physically impossible. The argument makes intuitive sense, but the jury is still out. Duke University scientists have recently reported evidence that fluids—albeit not fracking fluids—have migrated upward from the Marcellus Shale through natural fissures.

In an earlier study the Duke researchers sampled 60 private water wells in northeastern Pennsylvania and found no sign of fracking fluids. But they did find that methane levels were on average 17 times higher in wells near drilling sites and that some of the methane had the chemical signature of shale gas. It may have leaked into the shallow aquifers, they said, through faulty casings around the gas wells. The Pennsylvania Department of Environmental Protection (DEP) also blamed faulty casings in 2009 when it fined Cabot Oil & Gas for contaminating the drinking supplies of 19 homes in Dimock Township, 60 miles east of the Vargson farm. In that case the methane came not from the shale but from shallow deposits traversed by the gas wells. DEP has also fined gas companies for mishandling fracking wastewater and allowing spills that polluted creeks and rivers.

In Pennsylvania and elsewhere, shale-gas drilling has raced far ahead of efforts to understand and limit its impact. So far, however, its impact seems much smaller than that of coal mining—which in Pennsylvania has caused far worse river pollution, in West Virginia has lopped the tops off numerous mountains, and in the U.S. still kills hundreds of miners a

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year, mostly through black lung disease. The comparison is relevant because cheap natural gas is reducing coal burning. As recently as 2007, coal generated nearly half of U.S. electricity. Last March its share fell to 34 percent.

John Hanger, a Pennsylvania lawyer who helped author the state's renewable-energy standards, ran the DEP from 2008 to early 2011. Though he tightened regulations on the gas industry and handed out substantial fines, he was attacked by opponents who wanted a complete halt to fracking. Hanger believes such critics are missing the big picture. "The massive switching from coal to gas has done more to clean Pennsylvania's air, and America's air, than probably any other single thing we've ever done," he says.

Unlike coal, natural gas burns without spewing sulfur dioxide, mercury, or particulates into the air or leaving ash behind. And it emits only half as much carbon dioxide. The greenhouse gas inventory compiled by the U.S. Environmental Protection Agency (EPA) shows that the nation's CO₂ emissions in 2010 were lower than in 2005 by just over 400 million metric tons, or 7 percent. (Preliminary data for 2011 indicate a further decrease.) Reduced emissions from power plants, mostly because many have switched from coal to gas, accounted for a bit over a third of that.

Some environmentalists who once welcomed shale gas with precisely that expectation changed their minds after watching the boom in Pennsylvania. But Hanger hopes it spreads around the world, as it seems likely to. "In China they're sitting on potentially huge supplies of shale gas," he says. "It would be an enormous climate benefit if China were to substitute gas for some of its coal burning. And it's an immediate benefit—you don't have to wait until 2040 or 2050."

Unless too much methane leaks into the atmosphere. As U.S. CO₂ emissions fell between 2005 and 2010, methane emissions rose. By 2010, EPA says, the rise was equivalent in global warming potential to around 40 million metric tons of CO₂ annually, which means it offset 10 percent of the CO₂ decline. More than half of that methane increase, says EPA, came from the natural gas industry—the country's biggest emitter.

Judging by EPA's numbers, fracking still seems like a clear win for the climate. But some scientists, notably Robert Howarth and his coworkers at Cornell University, believe EPA has underestimated methane emissions and, more important, the global warming potential of each methane molecule. They argue that methane leaking from wells, pipes, compressors, and storage tanks actually makes shale gas worse for the climate than coal. Other researchers question Howarth's approach. The debate persists in part because methane numbers are so uncertain.

New rules issued by EPA this year will require the gas industry to measure its emissions and also to reduce them. One of the biggest leaks occurs when a fracked well is completed and high-pressure fracking fluids surge back up the well, bringing methane with them. The new rules will require gas companies to start capturing that methane by 2015, using technology that's already required in Wyoming, Colorado, and parts of Texas.

Some experts consider methane capture a great opportunity: an easier way than controlling CO₂ to slow global warming, at least in the short term, because small amounts of methane make a big difference and because it's a valuable fuel. China, for instance, the world's largest coal producer, vents huge amounts of methane from its mines to prevent explosions. In the 1990s, when Egyptian geologist Mohamed El-Ashry headed the Global Environment Facility, an agency created by the United Nations and the World Bank, it devoted ten million dollars to projects that siphoned methane from several Chinese mines and delivered it as fuel to thousands of nearby households. Hundreds of such projects await funding worldwide, El-Ashry says.

Drew Shindell, a climate scientist at NASA's Goddard Institute for Space Studies, recently led a global team of scientists in analyzing seven methane-reduction strategies, from draining rice fields to capturing the gas that escapes from landfills and gas wells. Unlike CO₂, methane affects human health, because it's a precursor of smog. When health impacts are included, Shindell's group found, the benefits of methane controls outweigh the costs by at least 3 to 1, and in some cases by as much as 20 to 1.

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"There are some sources that are difficult, if not impossible, to control," says Shindell. "The Arctic emissions—I'd probably vote those as being near impossible. But then you have long-distance gas pipelines, and we know exactly how to control leaks from those: put in and maintain high-quality seals. And there are other places, especially in oil, gas, and coal production. It's really straightforward to get a substantial fraction of methane emissions under control."

Last spring, as the annual thaw began in Alaska, Katey Walter Anthony heard from her friend Bill Wetzen, who owns Goldstream Lake and sometimes brings her coffee out on the ice. When Wetzen bought the property 20 years ago, he built his bungalow about 20 yards from the lake; by last year it was nearly at the water's edge. Now, Wetzen said, with the permafrost thawing beneath it, the walls and floors were tearing apart. He was going to have to move.

Also last spring, DOE-funded researchers on Alaska's North Slope successfully tested a method of extracting methane from buried hydrates. Though the process "may take years" to become economically viable, said the DOE press release, "the same could be said of the early shale gas research ... that the Department backed in the 1970s and 1980s." If even a small fraction of methane hydrates becomes recoverable, DOE estimates, that could double U.S. gas resources.

Some of the methane bubbling from Arctic lakes, Walter Anthony says, might come from hydrates. Around 56 million years ago, in the Paleocene, a long planetary warming culminated in a sudden temperature spike of 9°F; many scientists suspect a massive destabilization of methane hydrates. Most, including Walter Anthony, do not think such a catastrophe is likely now. But Arctic methane could add a lot to global warming over the next few centuries.

"If we could only capture it, it would make a great energy source," Walter Anthony says.

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Lenape Resources Lawsuit Challenges Avon, New York Gas Drilling Moratorium Huffington Post, The

11/29/2012

ALBANY, N.Y. (AP) — A natural gas drilling company is suing state regulators and a western New York town where it has operated for decades over a local moratorium that threatens to put the company out of business.

Papers were served this week in a lawsuit against the Livingston County town of Avon and the state Department of Environmental Conservation, said John Holko, owner of Lenape Resources, a small natural gas company based in Alexander, 35 miles southwest of Rochester. Holko is seeking at least \$50 million in damages from the town, claiming its recent ban on gas drilling and storage has cost Lenape millions of dollars in lost business and unused mineral rights.

"I've drilled over 100 wells in this county," Holko said. "I have 100 miles of pipeline, compressor stations and a disposal well. I supply gas to farmers, industrial users and interstate commerce. Now, because three guys on a town board decide they don't want me here anymore, I'm out of business. There's something dramatically wrong with that."

Holko said the town's gas-drilling moratorium and similar ones passed by dozens of other upstate New York towns violate a 1981 law giving the state Department of Environmental Conservation sole authority to regulate oil and gas development. He's also suing DEC, saying it's required to take action against the local bans.

Local courts have upheld drilling bans in the towns of Middlefield and Dryden. Both cases are under appeal with arguments before the state Appellate Division expected in February. Lenape's suit is the first that also names DEC.

"This issue is before the courts and we will let that process progress," DEC spokeswoman Emily DeSantis said Thursday in response to a question about the Lenape lawsuit.

Avon Town Supervisor David LeFeber said Thursday that he could not comment on pending litigation.

DEC has had a moratorium on gas wells using horizontal drilling and high-volume hydraulic fracturing since it began an environmental impact review in 2008. The technology frees gas by injecting a well with millions of gallons of chemically treated water at high pressure to crack rock deep underground. Environmental groups say it could contaminate air and drinking water supplies or cause other harm, but drillers and DEC say state regulations and standard industry safeguards protect against harm from drilling and fracking.

A deadline for finalizing new regulations expired on Thursday, but DEC sought a 90-day extension to allow a health impact study to be completed. Revised regulations will be released for public comment within that 90-day period.

Lenape's wells, drilled in sandstone deposits, aren't subject to the state's moratorium because they're vertically drilled and use low-volume fracking rather than the newer technologies necessary for shale gas development.

Michael Joy, a Pittsburgh lawyer representing Lenape, said papers filed with the lawsuit demonstrate that Avon officials weren't acting to prevent a problem caused by gas drilling, but were bowing to political pressure from anti-drilling groups.

Local control over gas drilling has also been an issue in other states in the Marcellus Shale region, which includes southern New York, Pennsylvania, Ohio and West Virginia. The gas industry says local laws create a patchwork of regulation that thwarts development.

State Lawmakers And Environmental Activists Express Opposition To Hydro Fracking

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NEW YORK, NY - JANUARY 11: Opponents of hydraulic fracturing in New York state attend a news conference and rally against hydraulic fracturing, also known as fracking, on January 11, 2012 in New York City. The event, which was held on the steps of City Hall, called for an end to the controversial gas drilling method as environmental groups increasingly warn about contamination of the state's aquifers that could poison its drinking water. (Photo by Spencer Platt/Getty Images)

State Lawmakers And Environmental Activists Express Opposition To Hydro Fracking

NEW YORK, NY - JANUARY 11: Eric Weltman of Food & Water Watch attends a news conference and rally against hydraulic fracturing, also known as fracking, in New York State on January 11, 2012 in New York City. The event, which was held on the steps of City Hall, called for an end to the controversial gas drilling method as environmental groups increasingly warn about contamination of the state's aquifers that could poison its drinking water. (Photo by Spencer Platt/Getty Images)

Department Of Environmental Conservation Holds Hydro Fracking Hearing

NEW YORK, NY - NOVEMBER 30: Opponents and supporters of gas-drilling, or fracking, walk into the last of four public hearings on proposed fracking regulations in upstate New York on November 30, 2011 in New York City. Fracking, a process that injects millions of gallons of chemical mixed water into a well in order to release gas, has become a contentious issue in New York as critics of the process believe it contaminates drinking water among other hazards. New York City gets much of its drinking water from upstate reservoirs. If the regulations are approved, drilling in the upstate New York Marcellus Shale could begin next year. (Photo by Spencer Platt/Getty Images)

Cuadrilla Shale Fracking Plant

PRESTON, LANCASHIRE - OCTOBER 07: Engineers on the drilling platform of the Cuadrilla shale fracking facility on October 7, 2012 in Preston, Lancashire. The controversial method of extracting gas by pumping high pressure water and chemicals into shale formations deep underground has been blamed for two minor earthquakes in the surrounding region. Environmental campaigners are calling for a halt to the drilling of what Cuadrilla believe could be significant reserves of natural gas. (Photo by Matthew Lloyd/Getty Images)

Cuadrilla Shale Fracking Plant

PRESTON, LANCASHIRE - OCTOBER 07: Engineers at work on the drilling platform of the Cuadrilla shale fracking facility on October 7, 2012 in Preston, Lancashire. The controversial method of extracting gas by pumping high pressure water and chemicals into shale formations deep underground has been blamed for two minor earthquakes in the surrounding region. Environmental campaigners are calling for a halt to the drilling of what Cuadrilla believe could be significant reserves of natural gas. (Photo by Matthew Lloyd/Getty Images)

Cuadrilla Shale Fracking Plant

PRESTON, LANCASHIRE - OCTOBER 07: General views of the Cuadrilla shale fracking facility on October 7, 2012 in Preston, Lancashire. The controversial method of extracting gas by pumping high pressure water and chemicals into shale formations deep underground has been blamed for two minor earthquakes in the surrounding region. Environmental campaigners are calling for a halt to the drilling of what Cuadrilla believe could be significant reserves of natural gas. (Photo by Matthew Lloyd/Getty Images)

Cuadrilla Shale Fracking Plant

PRESTON, LANCASHIRE - OCTOBER 07: Engineers look at the Cuadrilla shale fracking facility on October 7, 2012 in

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Preston, Lancashire. The controversial method of extracting gas by pumping high pressure water and chemicals into shale formations deep underground has been blamed for two minor earthquakes in the surrounding region. Environmental campaigners are calling for a halt to the drilling of what Cuadrilla believe could be significant reserves of natural gas. (Photo by Matthew Lloyd/Getty Images)

Cuadrilla Shale Fracking Plant

PRESTON, LANCASHIRE - OCTOBER 07: A lump of shale rock on display at the Cuadrilla shale fracking facility on October 7, 2012 in Preston, Lancashire. The controversial method of extracting gas by pumping high pressure water and chemicals into shale formations deep underground has been blamed for two minor earthquakes in the surrounding region. Environmental campaigners are calling for a halt to the drilling of what Cuadrilla believe could be significant reserves of natural gas. (Photo by Matthew Lloyd/Getty Images)

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Cuadrilla Shale Fracking Plant

PRESTON, LANCASHIRE - OCTOBER 07: Drill heads on display at the entrance to the Cuadrilla shale fracking facility on October 7, 2012 in Preston, Lancashire. The controversial method of extracting gas by pumping high pressure water and chemicals into shale formations deep underground has been blamed for two minor earthquakes in the surrounding region. Environmental campaigners are calling for a halt to the drilling of what Cuadrilla believe could be significant reserves of natural gas. (Photo by Matthew Lloyd/Getty Images)

Cuadrilla Shale Fracking Plant

PRESTON, LANCASHIRE - OCTOBER 07: An engineer displays a lump of shale rock at the Cuadrilla shale fracking facility on October 7, 2012 in Preston, Lancashire. The controversial method of extracting gas by pumping high pressure water and chemicals into shale formations deep underground has been blamed for two minor earthquakes in the surrounding region. Environmental campaigners are calling for a halt to the drilling of what Cuadrilla believe could be significant reserves of natural gas. (Photo by Matthew Lloyd/Getty Images)

Hydraulic Fracturing Prevention Press Conference

NEW YORK, NY - APRIL 25: Actor/director Mark Ruffalo (C) speaks at the Hydraulic Fracturing prevention press conference urging the protection of the drinking water source of 15 million Americans at Foley Square on April 25, 2011 in New York City. (Photo by D Dipasupil/Getty Images)

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Hydraulic Fracturing Prevention Press Conference

NEW YORK, NY - APRIL 25: (L-R) Actor/director Mark Ruffalo, Denise Katzman, Wenonah Hauter, and Water Defense co-founder/campaign director Claire Sandberg attend the Hydraulic Fracturing prevention press conference urging the protection of the drinking water source of 15 million Americans at Foley Square on April 25, 2011 in New York City. (Photo by D Dipasupil/Getty Images)

Josh Fox on Obama, the EPA, and House Republicans Who Had Him Arrested

HuffPost Green Editor Joanna Zelman talks to Josh Fox, director of the documentary 'Gasland,' about hydro-fracking, the EPA, and the House Republicans who had him arrested during a Congressional hearing.

Game Changer in Green: Mark Ruffalo

The expertise and the grassroots zeal Mark Ruffalo has brought to the issue of fracking is changing the game in green.

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**The imperial presidency continues on
Express-Star - Online, The**

11/29/2012

Opinion

November 29, 2012

The imperial presidency continues on

WASHINGTON D.C. -

Whether or not one agrees with his policies and political philosophy, it is irrefutable that President Obama's administration has been characterized by a noticeable tendency to go outside the legislative process to enact his policy priorities via regulation. Even the New York Times has noted "an increasingly deliberate pattern by the administration to circumvent lawmakers." The Wall Street Journal explained this pattern simply: "Mr. Obama proposes, Congress refuses, he does it anyway."

This habitual tendency to bypass Congress is not just an academic issue for constitutional scholars to ponder. Far from restricting his executive overreach to minor matters, President Obama has enacted by executive fiat major policy changes that have significant consequences for Americans' daily lives and finances.

Republican Majority Leader Eric Cantor recently released an extensive report chronicling the Obama administration's serial abuse of executive powers. Titled "The Imperial Presidency," the report highlights 40 instances in which the president bypassed Congress and the American people to unilaterally implement his liberal policies.

A prime example is the Environmental Protection Agency (EPA). When the president's economically disastrous cap-and-trade policy failed to win even Democratic support in Congress, his EPA began implementing it anyway. Explaining that "cap-and-trade was just one way of skinning the cat...And I'm going to be looking for other means," the president and the EPA used the existing Clean Air Act to issue regulations to enforce major aspects of the cap-and-trade legislation. New EPA mandates regulating coal-fired power plants are so restrictive that some of these electric generation plants have been forced to shut down, jeopardizing jobs both at the plants and in the coal mining industry. The EPA has indicated its intention to apply to same approach to natural gas exploration. Despite legislative language curtailing EPA authority of hydraulic fracturing in favor of state-level control, EPA's Office of Science Policy recently stated that the agency is taking "a pretty comprehensive look at all the statutes" to find "holes" they can exploit to exercise greater oversight.

The Obama administration has also ignored Congress regarding oil exploration. Although Congress acted in 2008 to lift a ban on offshore drilling, the Department of Interior announced its plan to reinstate the moratorium in the Gulf of Mexico in 2010. A federal judge overturned the ban four months later, but not in time to prevent its infliction of even more job loss and economic harm to a region already struggling to recover from the BP oil spill.

Virtually no aspect of civic life has been left untouched by the president's overreach. His administration undermined the landmark success of welfare reform by doing away with work requirements, attempted to force a Boeing plant to relocate from South Carolina to more union-friendly Washington, instituted a board empowered to make significant Medicare cuts without congressional approval, and committed the U.S. military to intervene in Libya without seeking the congressional authorization expressly required under the Constitution.

Such major policy changes should only be implemented after extensive and transparent legislative debate that gives the

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American people and their elected representatives the opportunity to evaluate the potential outcomes and reach consensus. Bypassing the constitutional process puts responsibility in the hands of unelected, unaccountable bureaucrats with alarming consequences for individual liberty, economic prosperity, and the rule of law. Regardless of which party occupies the White House, the legislative process established under the Constitution should be respected.

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Opinion

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Room for feds and states in regulation of hydraulic fracturing
FuelFix.com

11/29/2012

As hydraulic fracturing increasingly looks to be a future key source of energy in the US, it provides state and federal regulators an opportunity to develop complimentary roles in providing oversight of water use, a former federal water regulator said.

The states have a natural role in providing permits and specific regulations, while the federal government could provide a broader perspective on how energy and environmental concerns meet, said Ben Grumbles, president of the U.S. Water Alliance and former Assistant Administrator for Water at the Environmental Protection Agency, speaking at the Total Energy USA conference in Houston.

"There is a role for the federal government not just for providing science but for regulatory guidance on how you meet energy and environmental needs together," Grumbles said. "It is also a positive development that states are stepping up and developing more regulatory programs and oversight on fracturing operations."

Grumbles noted that many states, including Texas, Wyoming and Colorado, have increased disclosure requirements on chemicals used in water for hydraulic fracturing purposes.

Grumbles anticipates that the federal role in water regulatory oversight for hydraulic fracturing will focus more on research and education, but he notes that it also has a role in overseeing state programs that will likely remain.

"The Clean Water Act currently has a role to provide overall guidelines for state run permit programs for surface water challenges," Grumbles said. "I don't see the EPA getting out of that business or Congress dismissing them from the Clean Water Act."

While there have been some calls for Congress to revisit the 2005 Energy Policy Act, which exempted water for hydraulic fracturing from Clean Water Act regulations, Grumbles said that he doesn't "see that happening anytime in the near future".

However, while there are strong arguments about state rather than federal regulation of water use in hydraulic fracturing, how states will find the funds to provide these services remains an outstanding question.

"The more states step up for tracking operations, there are legitimate concerns about their funding, and where the funding will come from," Grumbles said.

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**MIT: Fugitive methane emissions from shale gas wells overstated
State Journal - Online, The**

11/29/2012

Fugitive methane emissions from completion of shale gas wells have been overstated, according to a new study from the Massachusetts Institute of Technology.

These emissions may be significant, at 3.6 percent of fugitive emissions from the industry, according to "Shale gas production: potential versus actual greenhouse gas emissions," published Nov. 26 in the peer-reviewed journal Environmental Research Letters.

But field practices are managing more of the potential emissions than other researchers have asserted.

It was long and widely said that natural gas emits half the greenhouse gases of coal, a generalization based on a comparison of carbon dioxide emissions when the two are burned for electricity.

But a 2011 study from Robert Howarth of Cornell University looking at the "lifecycle" extraction_to_end use greenhouse gas footprint of shale gas set off a public debate.

Howarth's study found that, when operators who use high-volume hydraulic fracturing into shale formations "complete" their wells - that is, make them ready for production - they release large volumes of methane, a far more potent greenhouse gas than carbon dioxide.

The study estimated that, including methane released during completion and methane leaked afterward during processing, transmission, storage and distribution, as much as 8 percent of a shale well's final volume could be lost to the atmosphere. The study concluded that the global warming potential of shale gas exceeds that of coal over a 20-year time frame and is comparable over a 100-year time frame.

While a spate of estimates since that time have ranged, generally, from 2 to 10 percent of total production volume released as fugitive emissions, scientists coming in all across that spectrum have agreed that much of the fugitive methane is released specifically during the week or so of well completion.

The MIT study disagrees.

The researchers looked at production data on 4,000 new wells in the five most productive shale formations in 2010 - Barnett, Fayetteville, Haynesville, Marcellus and Woodford shales.

Data on the key question of emissions during well completion are scarce, they acknowledged.

"Significant opaqueness surrounds real world gas handling practices in the field, and what proportion of gas produced during well completions is subject to which handling techniques," they wrote.

Howarth, they wrote, assumed that all potential fugitive emissions are vented. The U.S. Environmental Protection Agency has assumed that half of fugitive emissions are vented.

The MIT researchers themselves referenced an industry-sponsored survey of practices used at about 1,600 wells - acknowledging its industry source but noting that it is the most comprehensive study available - and supplemented that information with interviews with industry, the EPA and others.

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They concluded that methane generated during well completion is captured at 70 percent of wells, flared at 15 percent and vented at only 15 percent.

That reduces fugitive emissions from an average potential of 228 megagrams of methane per well to their estimate of 50 megagrams per well.

Overall, according to their calculations, 0.4 percent to 1.0 percent of a well's ultimate production volume is lost through fugitive emissions.

An April 2012 rule from the EPA requires operators to flare their gas during completion or to capture it rather than venting it.

But this study suggests that shale well completion is not necessarily a hot spot for controlling gas-industry emissions - that emissions come, rather, from points throughout the gas production, processing, transport and delivery processes.

"Although fugitive emissions from the overall natural gas sector are a proper concern, it is incorrect to suggest that shale gas-related hydraulic fracturing has substantially altered the overall greenhouse gas intensity of natural gas production," they authors wrote.

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'Fugitive' Methane from Shale Gas Lower than Believed Laboratory Equipment - Online

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Home

'Fugitive' Methane from Shale Gas Lower than Believed

Thu, 11/29/2012 - 8:46am

MIT Joint Program on the Science and Policy of Global Change

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While the U.S. lags in developing a broad-based climate policy, the nation's carbon emissions reached a 20-year low this year. Many have attributed some of that drop to a booming supply of low-carbon natural gas, of which the U.S. is the world's largest producer. But does natural gas, and specifically the quickly-developing production of shale gas, create other emissions – like methane – that could be just as harmful? A new study by MIT researchers shows the amount of methane emissions caused by shale gas production has been largely exaggerated.

"While increased efforts need to be made to reduce emissions from the gas industry overall, the production of shale gas has not significantly increased total emissions from the sector," says Francis O'Sullivan, a researcher at MIT's Energy Initiative and the lead author of the study released this week in *Environmental Research Letters*.

The research comes amidst several other reports on the impact of "fugitive" methane emissions – gas leaked or purposefully vented during and immediately after the stage of shale gas production known as hydraulic fracturing. While many of these reports studied the amount of potential emissions associated with the hydraulic fracturing process, the MIT researchers stress that this is only part of the puzzle. Consideration must also be given to how this gas is handled at the drilling sites, the study shows.

"It's unrealistic to assume all potential emissions are vented," O'Sullivan says, "Not least because some states have regulations requiring flaring as a minimum gas handling method."

Sergey Paltsev, the study's co-author and the assistant director for economic research at the MIT Joint Program on the Science and Policy of Global Change, says companies also have an economic reason for wanting to capture this "fugitive" gas.

"When companies vent and flare methane they are losing gas that they could have captured and sold," Paltsev says. "When we compared the cost of installing the right equipment to capture this gas to the loss in revenue if it isn't captured, we found that the majority of shale wells make money by capturing the potential 'fugitive' emissions."

In talking with industry representatives and officials at the U.S. Environmental Protection Agency (EPA), O'Sullivan and Paltsev found that companies are already capturing about 70 percent of potential "fugitive" emissions. In factoring that into their analysis, the researchers find emissions from shale gas production to be strikingly lower than previous estimates of potential emissions.

Their analysis was based on data from each of the approximately 4,000 wells drilled in the five main U.S. shale drilling sites during 2010. Wells in two of those sites, Texas' Barnett shale and the Haynesville shale on the Texas-Louisiana

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boarder, had been studied by Robert Howarth from Cornell Univ. last year when he looked at potential emissions released by the industry. His study garnered much attention because it claimed the greenhouse gas footprint of shale gas was larger than that of conventional gas, oil, and, over a 20-year time frame, coal. That study, however, used very limited well datasets.

In studying potential emissions, Howarth found 252 Mg of methane emissions per well in the Barnett site and 4,638 Mg per well in the Haynesville site. The MIT researchers, using their comprehensive well dataset, found that the potential emissions per well in the Barnett and Haynesville sites were in fact 273 Mg and 1,177 Mg, respectively. When accounting for actual gas handling field practices, these emissions estimates were reduced to about 35 Mg per well of methane from an average Barnett well and 151 Mg from an average Haynesville well.

According to Adam Brandt, an Assistant Professor at Stanford Univ., this analysis, "Provides an important contribution to the literature by greatly improving our understanding of potential shale gas emissions using a very large dataset."

Brandt says, "Previous studies used much smaller and more uncertain datasets, while O'Sullivan and Paltsev have gathered a much larger and more comprehensive industry dataset. This significantly reduces the uncertainty associated with potential emissions from shale gas development."

A U.S. Department of Energy study confirmed that while electricity generated by gas produces half the emissions of coal generation, natural gas production does make up 3 percent of the nation's total emissions. While the overall benefits far outweigh the small increases during production, Paltsev believes the EPA's efforts to reduce those emissions through new air quality standards are a "step in the right direction."

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Fracking our Food Supply Nation - Online, The

11/29/2012

This article was produced in collaboration with the Food & Environment Reporting Network, an investigative reporting nonprofit focusing on food, agriculture and environmental health.

In a Brooklyn winery on a sultry July evening, an elegant crowd sips rosé and nibbles trout plucked from the gin-clear streams of upstate New York. The diners are here, with their checkbooks, to support a group called Chefs for the Marcellus, which works to protect the foodshed upon which hundreds of regional farm-to-fork restaurants depend. The foodshed is coincident with the Marcellus Shale, a geologic formation that arcs northeast from West Virginia through Pennsylvania and into New York State. As everyone invited here knows, the region is both agriculturally and energy rich, with vast quantities of natural gas sequestered deep below its fertile fields and forests.

In Pennsylvania, the oil and gas industry is already on a tear—drilling thousands of feet into ancient seabeds, then repeatedly fracturing (or “fracking”) these wells with millions of gallons of highly pressurized, chemically laced water, which shatters the surrounding shale and releases fossil fuels. New York, meanwhile, is on its own natural-resource tear, with hundreds of newly opened breweries, wineries, organic dairies and pastured livestock operations—all of them capitalizing on the metropolitan area’s hunger to localize its diet.

But there’s growing evidence that these two impulses, toward energy and food independence, may be at odds with each other.

Tonight’s guests have heard about residential drinking wells tainted by fracking fluids in Pennsylvania, Wyoming and Colorado. They’ve read about lingering rashes, nosebleeds and respiratory trauma in oil-patch communities, which are mostly rural, undeveloped, and lacking in political influence and economic prospects. The trout nibblers in the winery sympathize with the suffering of those communities. But their main concern tonight is a more insidious matter: the potential for drilling and fracking operations to contaminate our food. The early evidence from heavily fracked regions, especially from ranchers, is not reassuring.

Jacki Schilke and her sixty cattle live in the top left corner of North Dakota, a windswept, golden-hued landscape in the heart of the Bakken Shale. Schilke’s neighbors love her black Angus beef, but she’s no longer sharing or eating it—not since fracking began on thirty-two oil and gas wells within three miles of her 160-acre ranch and five of her cows dropped dead. Schilke herself is in poor health. A handsome 53-year-old with a faded blond ponytail and direct blue eyes, she often feels lightheaded when she ventures outside. She limps and has chronic pain in her lungs, as well as rashes that have lingered for a year. Once, a visit to the barn ended with respiratory distress and a trip to the emergency room. Schilke also has back pain linked with overworked kidneys, and on some mornings she urinates a stream of blood.

Ambient air testing by a certified environmental consultant detected elevated levels of benzene, methane, chloroform, butane, propane, toluene and xylene—compounds associated with drilling and fracking, and also with cancers, birth defects and organ damage. Her well tested high for sulfates, chromium, chloride and strontium; her blood tested positive for acetone, plus the heavy metals arsenic (linked with skin lesions, cancers and cardiovascular disease) and germanium (linked with muscle weakness and skin rashes). Both she and her husband, who works in oilfield services, have recently lost crowns and fillings from their teeth; tooth loss is associated with radiation poisoning and high selenium levels, also found in the Schilkes’ water.

State health and agriculture officials acknowledged Schilke’s air and water tests but told her she had nothing to worry about. Her doctors, however, diagnosed her with neurotoxic damage and constricted airways. “I realized that this place is

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killing me and my cattle," Schilke says. She began using inhalers and a nebulizer, switched to bottled water, and quit eating her own beef and the vegetables from her garden. (Schilke sells her cattle only to buyers who will finish raising them outside the shale area, where she presumes that any chemical contamination will clear after a few months.) "My health improved," Schilke says, "but I thought, 'Oh my God, what are we doing to this land?'"

Schilke's story reminds us that farmers need clean water, clean air and clean soil to produce healthful food. But as the largest private landholders in shale areas across the nation, farmers are disproportionately being approached by energy companies eager to extract oil and gas from beneath their properties. Already, some are regretting it.

Earlier this year, Michelle Bamberger, an Ithaca veterinarian, and Robert Oswald, a professor of molecular medicine at Cornell's College of Veterinary Medicine, published the first (and, so far, only) peer-reviewed report to suggest a link between fracking and illness in food animals. The authors compiled case studies of twenty-four farmers in six shale-gas states whose livestock experienced neurological, reproductive and acute gastrointestinal problems. Exposed either accidentally or incidentally to fracking chemicals in the water or air, scores of animals have died. The death toll is insignificant when measured against the nation's livestock population (some 97 million beef cattle go to market each year), but environmental advocates believe these animals constitute an early warning.

Exposed animals "are making their way into the food system, and it's very worrisome to us," Bamberger says. "They live in areas that have tested positive for air, water and soil contamination. Some of these chemicals could appear in milk and meat products made from these animals."

In Louisiana, seventeen cows died after an hour's exposure to spilled fracking fluid. (Most likely cause of death: respiratory failure.) In north central Pennsylvania, 140 cattle were exposed to fracking wastewater when an impoundment was breached. Approximately seventy cows died; the remainder produced eleven calves, of which only three survived. In western Pennsylvania, an overflowing waste pit sent fracking chemicals into a pond and a pasture where pregnant cows grazed: half their calves were born dead. The following year's animal births were sexually skewed, with ten females and two males, instead of the usual 50-50 or 60-40 split.

In addition to the cases documented by Bamberger, hair testing of sick cattle that grazed around well pads in New Mexico found petroleum residues in fifty-four of fifty-six animals. In North Dakota, wind-borne fly ash, which is used to solidify the waste from drilling holes and contains heavy metals, settled over a farm: one cow, which either inhaled or ingested the caustic dust, died, and a stock pond was contaminated with arsenic at double the accepted level for drinking water.

Cattle that die on the farm don't make it into the nation's food system. (Though they're often rendered to make animal feed for chickens and pigs—yet another cause for concern.) But herd mates that appear healthy, despite being exposed to the same compounds, do: farmers aren't required to prove their livestock are free of fracking contaminants before middlemen purchase them. Bamberger and Oswald consider these animals sentinels for human health. "They're outdoors all day long, so they're constantly exposed to air, soil and groundwater, with no break to go to work or the supermarket," Bamberger says. "And they have more frequent reproductive cycles, so we can see toxic effects much sooner than with humans."

Fracking a single well requires up to 7 million gallons of water, plus an additional 400,000 gallons of additives, including lubricants, biocides, scale and rust inhibitors, solvents, foaming and defoaming agents, emulsifiers and de-emulsifiers, stabilizers and breakers. About 70 percent of the liquid that goes down a borehole eventually comes up—now further tainted with such deep-earth compounds as sodium, chloride, bromide, arsenic, barium, uranium, radium and radon. (These substances occur naturally, but many of them can cause illness if ingested or inhaled over time.) This super-salty "produced" water, or brine, can be stored on-site for reuse. Depending on state regulations, it can also be held in plastic-lined pits until it evaporates, is injected back into the earth, or gets hauled to municipal wastewater treatment plants, which aren't designed to neutralize or sequester fracking chemicals (in other words, they're discharged with effluent into nearby streams).

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At almost every stage of developing and operating an oil or gas well, chemicals and compounds can be introduced into the environment. Radioactive material above background levels has been detected in air, soil and water at or near gas-drilling sites. Volatile organic compounds—including benzene, toluene, ethylene and xylene—waft from flares, engines, compressors, pipelines, flanges, open tanks, spills and ponds. (The good news: VOCs don't accumulate in animals or plants. The bad news: inhalation exposure is linked to cancer and organ damage.)

Underground, petrochemicals can migrate along fissures through abandoned or orphaned wells or leaky well casings (the oil and gas industry estimates that 60 percent of wells will leak over a thirty-year period). Brine can spill from holding ponds or pipelines. It can be spread, legally in some places, on roadways to control dust and melt ice. Truck drivers have also been known to illegally dump this liquid in creeks or fields, where animals can drink it or lick it from their fur.

Although energy companies don't make a habit of telling potential lease signers about the environmental risks they might face, the Securities and Exchange Commission requires them to inform potential investors. In a 2008 filing, Cabot Industries cited "well site blowouts, cratering and explosions; equipment failures; uncontrolled flows of natural gas, oil or well fluids; fires; formations with abnormal pressures; pollution and other environmental risks." In 2011, oil companies in North Dakota reported more than 1,000 accidental releases of oil, drilling wastewater or other fluids, with many more releases likely unreported. Between 2008 and 2011, drilling companies in Pennsylvania reported 2,392 violations of law that posed a direct threat to the environment and safety of communities.

Schilke looks left and right, twice, for oncoming tanker trucks, then scoots down a gravel road in her camo-patterned four-wheeler. She parks alongside a leased pasture about a mile from her house and folds her body through a barbed-wire fence. "These guys are much healthier than those I've got at home," she says, puffing as she hikes up a straw-colored hill. "There's Judy...that's Buttercup...those are my little bulls." The black-faced animals turn to face her; some amble through the tall grass and present their foreheads for rubbing. "We're upwind of the drill rigs here," Schilke says. "They're high enough to miss some of the road dust, and they've got good water." Ever since a heater-treater unit, which separates oil, gas and brine, blew out on a drill pad a half-mile upwind of Schilke's ranch, her own creek has been clogged with scummy growth, and it regularly burps up methane. "No one can tell me what's going on," she says. But since the blowout, her creek has failed to freeze, despite temperatures of forty below. (Testing found sulfate levels of 4,000 parts per million: the EPA's health goal for sulfate is 250 parts per million.)

Schilke's troubles began in the summer of 2010, when a crew working at this site continued to force drilling fluid down a well that had sprung a leak. Soon, Schilke's cattle were limping, with swollen legs and infections. Cows quit producing milk for their calves; they lost from sixty to eighty pounds in a week; and their tails mysteriously dropped off. (Lab rats exposed to the carcinogen 2-butoxyethanol, a solvent used in fracking, have lost their tails, but a similar connection with cattle hasn't been shown. In people, breathing, touching or consuming enough of the chemical can lead to pulmonary edema and coma.)

An inveterate label reader who obsessively tracks her animals' nutritional intake, Schilke couldn't figure out what was wrong. Neither could local veterinarians. She nursed individual cows for weeks and, with much sorrow, put a \$5,000 bull out of its misery with a bullet. Upon examination, the animal's liver was found to be full of tunnels and its lungs congested with pneumonia. Before the year was out, five cows had died, in addition to several cats and two dogs. (A feline autopsy came back inconclusive, but subsequent hair testing of cows, cats and dogs revealed sulfate levels high enough to cause polio in cattle.) Inside Schilke's house today, where the china cabinets are kept empty for fear of a shattering drill-site explosion, nearly a dozen cats sneeze and cough, some with their heads tilted at a creepy angle.

Before the drilling started, two cars a day traveled down Schilke's gravel road. Now, it's 300 trucks hauling sand, fresh water, wastewater, chemicals, drill cuttings and drilling equipment. Most of the tankers are placarded for hazardous or radioactive material. Drilling and fracking a single well requires 2,000 truck trips, and each pass of a vehicle sends a cyclone of dust and exhaust fumes into the air. Mailbox numbers are obliterated, conversations are choked off, and

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animals die of “dust pneumonia.” (More formally known as bovine respiratory disease, the illness is associated with viral, fungal and bacterial infection.)

Ordinarily, Schilke hauls her calves to auction when they're eight months old. “Buyers come from everywhere for Dakota cows,” she says. The animals are then raised on pasture or in feedlots until they are big enough for slaughter. No longer Schilke cattle, they're soon part of the commodity food system: anonymous steaks and chops on supermarket shelves. Now, Schilke is diffident about selling her animals. “I could get good money for these steers,” she says, cocking her head toward a pair of sleek adolescents. “They seem to be in very good shape and should have been butchered. But I won't sell them because I don't know if they're OK.”

Nor does anyone else. By design, secrecy shrouds the hydrofracking process, casting a shadow that extends over consumers' right to know if their food is safe. Federal loopholes crafted under former Vice President Dick Cheney have exempted energy companies from key provisions of the Clean Air, Clean Water and Safe Drinking Water Acts, the Toxics Release Inventory, the Resource Conservation and Recovery Act, and the National Environmental Policy Act, which requires a full review of actions that may cause significant environmental impacts. If scientists and citizens can't find out precisely what is in drilling or fracking fluids or air emissions at any given time, it's difficult to test whether any contaminants have migrated into the water, soil or food—and whether they can harm humans. It gets even more complicated: without information on the interactions between these chemicals and others already existing in the environment, an animal's cause of death, Bamberger says, “is anyone's guess.”

Fracking proponents criticize Bamberger and Oswald's paper as a political, not a scientific, document. “They used anonymous sources, so no one can verify what they said,” Steve Everley, of the industry lobby group Energy In Depth, says. The authors didn't provide a scientific assessment of impacts—testing what quaternary ammonium compounds might do to cows that drink it, for example—so treating their findings as scientific, he continues, “is laughable at best, and dangerous for public debate at worst.” (Bamberger and Oswald acknowledge this lack of scientific assessment and blame the dearth of funding for fracking research and the industry's use of nondisclosure agreements.)

No one doubts that fracking fluids have the potential to do serious harm. Theo Colborn, an environmental health analyst and former director of the World Wildlife Fund's wildlife and contaminants program, identified 632 chemicals used in natural-gas production. More than 75 percent of them, she said, could affect sensory organs and the respiratory and gastrointestinal systems; 40 to 50 percent have potential impacts on the kidneys and on the nervous, immune and cardiovascular systems; 37 percent act on the hormone system; and 25 percent are linked with cancer or mutations.

Thanks to public pressure, several states have started to tighten regulations on the cement casings used to line wells, and the Obama administration recently required energy companies to disclose, on the industry-sponsored website fracfocus.org, the fracking chemicals used on public land. (States regulate fracking on private land and set different requirements.) Still, information about quantities and concentrations of the chemicals remains secret, as do compounds considered proprietary. Further, no state requires a company to disclose its ingredients until a fracking job is complete. At that point, it's easy to blame the presence of toxins in groundwater on a landowner's use of pesticides, fertilizers or even farm equipment.

Clearly, the technology to extract gas from shale has advanced faster, and with a lot more public funding, than has the study of its various effects. To date, there have been no systematic, peer-reviewed, long-term studies of the health effects of hydraulic fracturing for oil and gas production (one short-term, peer-reviewed study found that fracking emissions may contribute to acute and chronic health problems for people living near drill sites). And the risks to food safety may be even more difficult to parse.

“Different plants take up different compounds,” says John Stolz, an environmental microbiologist at Duquesne University. For example, rice and potatoes take up arsenic from water, but tomatoes don't. Sunflowers and rape take up uranium from soil, but it's unknown if grasses do. “There are a variety of organic compounds, metals and radioactive material that

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are of human health concern when livestock meat or milk is ingested,” says Motoko Mukai, a veterinary toxicologist at Cornell’s College of Veterinary Medicine. These “compounds accumulate in the fat and are excreted into milk. Some compounds are persistent and do not get metabolized easily.”

Veterinarians don’t know how long the chemicals may remain in animals, and the Food Safety Inspection Service, part of the US Department of Agriculture, isn’t looking for them in carcasses. Inspectors in slaughterhouses examine organs only if they look diseased. “It’s gross appearance, not microscopic,” Bamberger says of the inspections—which means that animals either tainted or sickened by those chemicals could enter the food chain undetected.

“The USDA focuses mostly on pathogens and pesticide residues,” says Tony Corbo, a senior lobbyist for Food and Water Watch. “We need to do risk assessments for these fracking chemicals and study tolerance levels.” The process, he adds, could take more than five years. In the meantime, fractivists are passing around a food-pyramid chart that depicts chemicals moving from plants into animals, from animals into people, and from people into... zombies.

The relatively small number of animals reported sick or dead invites the question: If oil and gas operations are so risky, why aren’t there more cases? There likely are, but few scientists are looking for them. (“Who’s got the money to study this?” Colborn asks rhetorically.) Rural vets won’t speak up for fear of retaliation. And farmers aren’t talking for myriad reasons: some receive royalty checks from the energy companies (either by choice or because the previous landowner leased their farm’s mineral rights); some have signed nondisclosure agreements after receiving a financial settlement; and some are in active litigation. Some farmers fear retribution from community members with leases; others don’t want to fall afoul of “food disparagement” laws or get sued by an oil company for defamation (as happened with one Texan after video of his flame-spouting garden hose was posted on the Internet. The oil company won; the homeowner is appealing).

And many would simply rather not know what’s going on. “It takes a long time to build up a herd’s reputation,” says rancher Dennis Bauste, of Trenton Lake, North Dakota. “I’m gonna sell my calves, and I don’t want them to be labeled as tainted. Besides, I wouldn’t know what to test for. Until there’s a big wipeout, a major problem, we’re not gonna hear much about this.” Ceylon Feiring, an area vet, concurs. “We’re just waiting for a wreck to happen with someone’s cattle,” she says. “Otherwise, it’s just one-offs”—a sick cow here and a dead goat there, easy for regulators, vets and even farmers to shrug off.

The National Cattlemen’s Beef Association takes no position on fracking, nor has it heard from members either concerned by or in favor of the process. And yet it’s ranchers and farmers—many of them industry-supporting conservatives—who are, increasingly, telling their stories to the media and risking all. These are the people who have watched helplessly as their livestock suffer and die. “It’s not our breeding or nutrition destroying these animals,” Schilke says, her voice rising in anger. “It’s the oilfield industry.”

However, some institutions that specialize in risk have started to connect the dots. Nationwide Mutual Insurance, which sells agricultural insurance, recently announced that it would not cover damages related to fracking. Rabobank, the world’s largest agricultural bank, reportedly no longer sells mortgages to farmers with gas leases. And in the boldest move yet by a government official, Christopher Portier, director of the National Center for Environmental Health at the Centers for Disease Control and Prevention, called for studies that “include all the ways people can be exposed, such as through air, water, soil, plants and animals.” While the EPA is in the midst of a \$1.9 million study of fracking’s impact on water, no government agency has taken up Portier’s challenge to study plants and animals.

The possibility of chemical contamination aside, oil and gas operations have already affected food producers. “I lost six acres of hayfields when the gas company put roads in,” says Terry Greenwood, a rancher in western Pennsylvania. “Now I have to buy more feed for my cattle.” (Like other farmers hurt by drilling and fracking, he still pays taxes on his unproductive land.) Others have lost the use of stock ponds or creeks to brine spills.

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"We've got 12,000 wells in the Bakken, and they each take up six acres," says Mark Trechock, former director of the Dakota Resource Council. "That's 72,000 acres right there, without counting the waste facilities, access roads, stored equipment and man camps that go along with the wells." Before the drilling boom, that land might have produced durum wheat, barley, oats, canola, flax, sunflowers, pinto beans, lentils and peas. In Pennsylvania, where nearly 6,500 wells have been drilled since 2000, the Nature Conservancy estimates that thirty acres are directly or indirectly affected for every well pad.

East of the Rockies, intensive drilling and fracking have pushed levels of smog, or ground-level ozone, higher than those of Los Angeles. Ozone significantly diminishes crop yields and reduces the nutritional value of forage. Flaring of raw gas can acidify soil and send fine particulate matter into the air; long-term exposure to this material has been linked to human heart and lung diseases and disruption to the endocrine system. Earlier this year, the Environmental Protection Agency finalized standards that require reductions in airborne emissions from gas wells, although the industry has more than two years to comply.

Besides clean air, farmers need clean water—lots of it. But some farmers now find themselves competing with energy companies for this increasingly precious resource. At water auctions in Colorado, the oil and gas industry has paid utilities up to twenty times the price that farmers typically pay. In Wyoming, ranchers have switched from raising beef to selling their water. Unwilling to risk her animals' health to creek water that's possibly tainted, Schilke spent \$4,000 last summer hauling safe water from town to her ranch. "I'd wait in line for hours," she says, "usually behind tanker trucks buying water to frack wells."

Given the absence of studies on the impacts of drilling and fracking in plants and animals, as well as inadequate inspection and scant traceability in the food chain, it's hard to know what level of risk consumers face when drinking milk or eating meat or vegetables produced in a frack zone. Unless, of course, you're Jacki Schilke, and you feel marginally healthier when you quit eating the food that you produced downwind or downstream from drill rigs. But many consumers—those intensely interested in where and how their food is grown—aren't waiting for hard data to tell them what is or isn't safe. For them, the perception of pollution is just as bad as the real thing. Ken Jaffe, who raises grass-fed cattle in upstate New York, says, "My beef sells itself. My farm is pristine. But a restaurant doesn't want to visit and see a drill pad on the horizon."

Nor do the 16,200 members of the Park Slope Food Co-op in Brooklyn, which buys one cow per week from Jaffe. "If hydrofracking is allowed in New York State, the co-op will have to stop buying from farms anywhere near the drilling because of fears of contamination," says Joe Holtz, general manager of the co-op. That's \$4 million in direct sales, with economic multipliers up and down the local food chain, affecting seed houses, creameries, equipment manufacturers and so on.

Already, wary farmers in the Marcellus are seeking land away from the shale. The outward migration is simultaneously raising prices for good farmland in the Hudson River Valley, which lies outside the shale zone, and depressing the price of land over the Marcellus. According to John Bingham, an organic farmer in upstate New York who is involved in regional planning, lower prices entice absentee investors to buy up farmland and gain favorable "farm rate" tax breaks, even as they speculate on the gas boom. "Fracking is not a healthy development for food security in regions near fracking or away from it," Bingham concludes.

Only recently has the Northeast's local-foods movement reached a critical mass, to the point where colleges and caterers trip over themselves in the quest for locally sourced and sustainably grown products. (New York has the fourth-highest number of organic farms in the nation.) But the movement's lofty ideals could turn out to be, in shale-gas areas, a double-edged sword. "People at the farmers' market are starting to ask exactly where this food comes from," says Stephen Cleghorn, a Pennsylvania goat farmer.

With a watchful eye on Pennsylvania's turmoil, many New York farmers have started to test their water pre-emptively, in

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the event that Governor Andrew Cuomo lifts the state's current moratorium on fracking. And in the commercial kitchens of a city obsessed with the provenance of its prosciutto, chefs like Heather Carlucci-Rodriguez, a founder of Chefs for the Marcellus and the executive pastry chef at Manhattan's Print Restaurant, are keeping careful tabs on their regional suppliers.

"I have a map of the Marcellus and my farmers on my office wall," Carlucci-Rodriguez says at the Brooklyn winery event. "So far, I haven't stopped buying from any- one. But I'm a believer in the precautionary principle." She nods to a colleague who's dishing up summer squash with peach slices and ricotta. "We shouldn't have to be defending our land and water," she says with a sigh. "We should be feeding people."

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More of the Same. Guess What Could Change That. (BGOV Briefs)
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U.S. Energy Policy? More of the Same

Photographer: Norm Betts/Bloomberg

Nov. 29 (Bloomberg) - Technological developments are revolutionizing the U.S. energy sector. In addition to increased output of renewables such as wind and solar power, advances in hydraulic fracturing and horizontal drilling are enabling companies to exploit the vast U.S. natural gas reserves. Some even predict the U.S. will become a net energy exporter in a decade or so, a dramatic turnaround from just a few years ago.

Given the far-reaching changes on the ground, now might be an opportune time to craft a national energy strategy. Both President Barack Obama and Republican Mitt Romney supported the development of such a plan during the recent campaign. But a better bet is that U.S. energy policy in the next couple of years will continue along the haphazard path it has traveled in the last few.

In a recent study, Bloomberg Government analyst Rob Barnett and Bloomberg New Energy Finance analysts Stephen Munro and Ethan Zindler conclude that the Environmental Protection Agency will continue to play the leading role in shaping U.S. energy policy in the next several years, by adopting specific regulations about circumscribed topics. They expect EPA to complete a number of regulatory initiatives started during President Barack Obama's first term, such as limiting the greenhouse gas emissions of existing power plants. Action by Congress to enact comprehensive energy legislation is seen as unlikely in the near term.

Politics is one reason the U.S. endures a piecemeal regulatory approach to energy rather than a more comprehensive legislative one. But fiscal realities may be changing the political calculus. The yawning federal budget deficit and the urgent need for new sources of revenue have revived talk in some quarters of a congressionally-mandated tax on carbon emissions. Though Congress seems unlikely to agree on such a measure at this time, the lure of revenue may eventually prove irresistible.

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